Anxiety, depression and perceived stress among nursing students and their family members in the post-COVID-19 setting: a cross-sectional study in Barranquilla, Colombia

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Abstract

Keywords
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Introduction: During the first year of the COVID-19 pandemic, the global prevalence of anxiety and depression rose by about 25%, with women and young people most affected. Now that the emergency phase is over, it is necessary to know the mental health status of university students' families, a group that is rarely measured directly.
Objective: To describe the levels of anxiety, depression and perceived stress among nursing students and their family members, and to explore their relationship with age, gender, socioeconomic stratum and religion.
Methods: Quantitative, descriptive, cross-sectional study with non-probability convenience sampling. Thirty-nine people aged 17 to 79 took part: third-semester nursing students at Universidad Metropolitana de Barranquilla and their family members. The GAD-7, the PHQ-9 and the 10-item Perceived Stress Scale (PSS-10) were administered.

Associations were tested with the chi-square test and, because of the small cell counts, with an exact test estimated by Monte Carlo simulation.
Results: Of the participants, 67% were women, 31% were aged 17 to 25, 49% belonged to socioeconomic stratum 2 and 87% were Catholic. Absence of symptoms and mild levels predominated. Mild anxiety was the most frequent category among those aged 17 to 25 (66.7%), and 25% of those aged 44 to 52 had severe anxiety. The chi-square test suggested an association between age and anxiety ($p = 0.046$), but the exact test did not confirm it ($p = 0.080$). No other variable was significantly associated with anxiety, depression or stress.
Conclusions: Participants mostly showed mild or no symptoms, with no significant differences by sociodemographic variables. The cross-sectional design and the sample size do not allow these levels to be attributed to the pandemic, but the cases of severe anxiety and moderately severe depression among middle-aged family members warrant follow-up of family mental health in the post-pandemic period.

1. INTRODUCTION

The COVID-19 pandemic disrupted daily life worldwide and exerted measurable effects on mental health. According to estimates from the Global Burden of Disease study, an additional 53.2 million cases of major depressive disorder and 76.2 million cases of anxiety disorders occurred globally in 2020, representing increases of 27.6% and 25.6%, respectively, with women and younger populations disproportionately affected (COVID-19 Mental Disorders Collaborators, 2021). The World Health Organization synthesized this evidence, reporting that the global prevalence of anxiety and depression surged by 25% during the first year of the pandemic (World Health Organization [WHO], 2022). Furthermore, the organization defines health as a state of complete physical, mental, and social well-being (World Health Organization [WHO], 1946); consequently, mental health constitutes an integral component of overall well-being and cannot be separated from it.

On May 5, 2023, the WHO declared that COVID-19 no longer constituted a public health emergency of international concern (WHO, 2023). Since then, academic research has shifted from acute crisis management toward examining persistent sequelae and recovery processes. Syntheses incorporating longitudinal data provide a more nuanced perspective on the notion of a generalized crisis. A meta-analysis of 134 cohorts identified only minimal symptom changes in the general population; among university students, no significant alterations were observed in general mental health or anxiety, along with only a slight increase in depressive symptoms, whereas deterioration was more pronounced among females and parents (Sun et al., 2023). Similarly, a longitudinal review of university students demonstrated that while the proportion of students experiencing moderate-to-severe depression increased during the implementation of mitigation measures, anxiety levels remained largely stable (Lee et al., 2023).

It is essential to distinguish among three distinct phenomena that are frequently conflated. Studies conducted during the acute phase captured distress linked to lockdowns and

pervasive uncertainty. In contrast, the post-pandemic period reflects the socio-occupational and academic restructuring that occurred following the conclusion of the health emergency. Distinct from both, the post-COVID-19 condition—commonly termed long COVID—is a clinically defined entity occurring in individuals with a probable or confirmed history of SARS-CoV-2 infection, characterized by symptoms that persist or emerge after the acute phase and cannot be explained by an alternative diagnosis (Soriano et al., 2022). Acute infection has also been associated with subsequent psychiatric morbidities; in a cohort of 236,379 survivors, 33.6% received a neurological or psychiatric diagnosis within the subsequent six months (Taquet et al., 2021). Because the present study did not ascertain prior infection history, its scope is confined to the second domain (the post-pandemic social and academic landscape) and does not assess post-COVID-19 condition.

In the Region of the Americas, the Pan American Health Organization's High-Level Commission on Mental Health and COVID-19 concluded that the pandemic exacerbated pre-existing mental health disparities (Pan American Health Organization [PAHO], 2023). Among health sciences students, a multicenter investigation involving nursing undergraduates from Colombia and Spain revealed that 61.9% of participants experienced mental health impairments, which were significantly associated with moderate family dysfunction and food insecurity, among other determinants (Tiga-Loza et al., 2024). In Peru, following the resumption of in-person classes in 2022, university students with caregiving responsibilities, female students, and those aged 16 to 25 years reported higher levels of depression, anxiety, and stress (Estrada-Araoz et al., 2023). These findings suggest that student mental health is inextricably linked to household conditions, underscoring the methodological rationale for evaluating students' family members alongside the student cohort.

In Colombia, Law 1616 of 2013, amended by Law 2460 of 2025, guarantees the full exercise of the fundamental right to mental health for the Colombian population (Congreso de la República de Colombia, 2013). Complementing this legislative framework, the National Mental Health Policy, adopted via Resolution 4886 of 2018, establishes operational guidelines for mental health promotion and the prevention of psychological distress and disorders across the country (Ministerio de Salud y Protección Social, 2018).

The objective of this study was to describe the levels of anxiety, depression, and perceived stress among nursing students at the Universidad Metropolitana de Barranquilla and their family members, as well as to explore associations with age, gender, socioeconomic status, and religious affiliation. By doing so, this study aims to provide localized empirical evidence to guide mental health promotion and prevention strategies in the post-pandemic context.

2. MATERIALS AND METHODS

Study design.

A quantitative, descriptive, cross-sectional study was conducted. The target population comprised third-semester nursing students enrolled in the Collective Health I course at the Universidad Metropolitana de Barranquilla (Colombia) and their family members. A total of 39 participants were selected through non-probability convenience sampling based on criteria aligned with the study objectives. Data collection spanned a period of two months.

Inclusion criteria encompassed nursing students from the Universidad Metropolitana and their relatives, aged 17 to 80 years, without restriction regarding religious affiliation, marital status, or geographic origin, who voluntarily agreed to participate.

Data were collected using three standardized instruments: the 7-item Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006), the 9-item Patient Health Questionnaire (PHQ-9; Diez-Quevedo et al., 2001) for depression, and the Spanish version of the 10-item Perceived Stress Scale (PSS-10; Remor, 2006). The independent variables were age, gender, socioeconomic stratum, and religious affiliation, while the dependent variables were the levels of anxiety, depression, and perceived stress.

Statistical analysis.

Data were tabulated and analyzed using STATGRAPHICS (Data Analysis Solutions), version 16. Categorical variables were summarized using absolute frequencies and percentages. Associations between sociodemographic variables and levels of anxiety, depression, and perceived stress were examined using Pearson's chi-square test of independence. Given that the majority of cells in the contingency tables had expected frequencies below five, the relationship between age and anxiety was additionally verified using an exact test estimated via Monte Carlo simulation (200,000 resamples). Statistical significance was set at $p < .05$.

Educational Activities With Participants.

Concurrently with the study, four educational sessions were carried out. The first session raised awareness regarding mental health and its risk factors; the second addressed the impact of parental mental health on children during the pandemic; the third focused on child and adolescent mental health care; and the fourth was dedicated to evaluating levels of anxiety and depression among participating families. Continuous communication was maintained throughout the process for health promotion and disease prevention purposes.

Instruments

Spanish-language versions of the three questionnaires were administered. The GAD-7 comprises seven items; total scores range from 0 to 21 and are categorized as minimal/no anxiety (0–4), mild (5–9), moderate (10–14), and severe anxiety (15–21; Spitzer et al., 2006). In Colombian medical professionals, the GAD-7 demonstrated a unidimensional structure and high internal consistency (Cronbach's $\alpha = .92$; Camargo et al., 2023).

The PHQ-9 consists of nine items scored on a 4-point Likert scale from 0 (*not at all*) to 3 (*nearly every day*). Total scores range from 0 to 27 and are classified into minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe depression (20–27). In Colombian primary care adult outpatients in Bucaramanga, the PHQ-9 demonstrated adequate reliability (Cronbach's $\alpha = .80$) and, at a cutoff score of 7, exhibited a sensitivity of 90.4% and a specificity of 81.7% (Cassiani-Miranda et al., 2021).

The PSS-10 evaluates perceived stress over the preceding month using five response categories: *never*, *almost never*, *sometimes*, *fairly often*, and *very often*, scored from 0 to 4. This scale does not possess standardized diagnostic cutoffs (Remor, 2006).

Ethical Considerations

The study adhered to the ethical principles established in the Declaration of Helsinki. Informed consent was obtained from all adult participants, and parental or legal guardian consent was secured for participants under 18 years of age. The research protocol was approved by the Scientific and Ethics Committee of the Universidad Metropolitana de Barranquilla, Colombia.

3. RESULTS

Of the 39 participants, 67% ($n = 26$) were female and 33% ($n = 13$) were male. Regarding age distribution, 31% ($n = 12$) were between 17 and 25 years old; 49% ($n = 19$) belonged to socioeconomic stratum 2; and 87% ($n = 34$) identified as Catholic. Categorical variables are reported as frequencies and percentages.

Relationship Between Anxiety and Study Variables

Table 1 displays the distribution of anxiety levels across age groups. Mild anxiety predominated in the 17-to-25-year age group (66.67%), whereas the absence of anxiety was most frequent among those aged 35 to 43 years (55.56%). In the 53-to-61-year cohort, mild anxiety was again the most prevalent category (75.00%). Notably, the 44-to-52-year age group accounted for both reported cases of severe anxiety (25.00%). Pearson's chi-square test initially suggested a statistically significant association between age and anxiety severity, $\chi^2(18) = 29.23$, $p = .046$. However, because 96.4% of the contingency cells had expected frequencies below five, the exact test estimated via Monte Carlo simulation did not confirm this association ($p = .080$).

Across gender groups, 30.77% of male participants reported no anxiety, whereas 15.38% presented severe anxiety. Among female participants, 46.15% reported mild anxiety and 11.54% moderate anxiety; these differences were not statistically significant ($p = .116$).

Regarding socioeconomic status, 50.00% of participants in stratum 1 exhibited no anxiety, whereas mild anxiety was predominant in stratum 2 (57.89%) and stratum 3 (50.00%). No anxiety cases were documented in stratum 4. Differences across socioeconomic strata did not reach statistical significance ($p = .250$).

With respect to religious affiliation, mild anxiety was observed in 50.00% of Catholic participants and 40.00% of Evangelical Christian participants. Differences by religious group were not statistically significant ($p = .679$).

Table 1.

Distribution of Anxiety Levels (GAD-7) by Age Group

Age Range (years)	None n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	p-value*
17–25	3 (25.00%)	8 (66.67%)	1 (8.33%)	0 (0.00%)	.0007
26–34	2 (66.67%)	0 (0.00%)	1 (33.33%)	0 (0.00%)	.1801
35–43	5 (55.56%)	4 (44.44%)	0 (0.00%)	0 (0.00%)	.0064
44–52	3 (37.50%)	3 (37.50%)	0 (0.00%)	2 (25.00%)	.2615
53–61	1 (25.00%)	3 (75.00%)	0 (0.00%)	0 (0.00%)	.0460
62–70	1 (50.00%)	1 (50.00%)	0 (0.00%)	0 (0.00%)	.4459
71–79	0 (0.00%)	0 (0.00%)	1 (100.00%)	0 (0.00%)	.2615

Note: *Percentages were calculated based on the total within each age group. Global test:* $\chi^2(18) = 29.23$, $p = .046$; *exact test via Monte Carlo simulation:* $p = .080$.

Source: *Prepared by the authors*

Relationship Between Depression and Study Variables

Among participants aged 17 to 34 years, 33.33% reported an absence of depressive symptoms. In the 44-to-52-year age group, 25.00% exhibited moderately severe depression, 12.50% moderate depression, and 25.00% mild depression. Differences across age groups were not statistically significant ($p = .442$).

Regarding gender, 30.77% of men presented no depressive symptoms, whereas 15.38% presented moderately severe depression. Among women, 7.69% reported moderate depression and 38.46% mild depression. These gender differences did not reach statistical significance ($p = .163$).

In relation to socioeconomic status, 21.43% of participants in stratum 1 reported no depression; in stratum 2, 5.26% exhibited moderately severe depression, 5.26% moderate depression, and 31.58% mild depression. Differences across socioeconomic strata were not statistically significant ($p = .075$).

With respect to religious affiliation, 20.00% of Evangelical Christian participants

presented no depressive symptoms. Among Catholic participants, 5.88% presented moderately severe depression, 11.76% moderate depression, and 38.24% mild depression. Differences by religious affiliation were not statistically significant ($p = .355$).

Relationship Between Stress and Study Variables

A total of 62.50% of participants aged 44 to 52 years reported low stress levels, whereas 11.11% of those aged 35 to 43 years exhibited high stress levels. Age-related differences were not statistically significant ($p = .548$). By gender, 76.92% of men reported low stress levels, compared to 11.54% of women who reported high stress levels; these differences were likewise not statistically significant ($p = .347$).

Regarding socioeconomic status, 75.00% of participants from stratum 3 and 7.14% from stratum 1 exhibited low stress levels. Differences across strata did not reach statistical significance ($p = .605$).

Among Catholic participants, 82.35% reported low stress levels, 17.65% moderately severe levels, and 11.76% high levels. Differences across religious affiliations were not statistically significant ($p = .307$).

4. DISCUSSION

Participants predominantly exhibited an absence of symptoms or mild manifestations of anxiety, depression, and stress. Furthermore, no sociodemographic variable demonstrated a statistically significant association with these psychological outcomes when assessed using statistical tests calibrated for the sample size. The association between age and anxiety suggested by the initial Pearson chi-square test was not confirmed by the exact test; thus, it should be interpreted purely as a descriptive pattern. Nonetheless, the preponderance of mild anxiety among individuals aged 17 to 25 years aligns with global epidemiological estimates indicating that younger cohorts were disproportionately affected during the pandemic (COVID-19 Mental Disorders Collaborators, 2021), as well as with elevated distress scores observed among university students aged 16 to 25 years following the resumption of in-person academic activities in Peru (Estrada-Araoz et al., 2023).

The predominance of mild symptom levels is also consistent with longitudinal evidence. The meta-analysis by Sun et al. (2023) identified no significant changes in general mental health or anxiety among university students and found only modest increments in depressive symptoms. Similarly, in the review conducted by Lee et al. (2023), moderate-to-severe depression increased during the enforcement of mitigation measures, while anxiety levels remained stable. Among Mexican nursing undergraduates assessed during the pandemic, depression (85.8%), anxiety (84.0%), and stress (77.4%) presented predominantly in mild forms and were not significantly associated with perceived family support (Pérez-Pérez et al., 2021).

In Colombia, during the physical distancing measures instituted in 2020, the *Solidaridad* survey conducted by Profamilia identified young adults aged 18 to 29 years as the most vulnerable demographic group, many of whom expressed pervasive distress regarding their ability to resume daily routines; nearly three out of five young adults reported unexplained fatigue, nervousness, or restlessness during the preceding 21 days (Cifuentes et al., 2020). Although these findings reflect the acute emergency phase and are not directly comparable to post-emergency assessments, they highlight the critical need for continued mental health monitoring in youth populations.

Ramírez-Ortiz et al. (2020), in a conceptual analysis published by researchers from the Universidad Nacional de Colombia at the onset of the pandemic, warned that social confinement could elicit psychological alterations ranging from isolated symptoms to formal clinical disorders—such as insomnia, anxiety, depression, and post-traumatic

stress disorder—drawing parallels to historical epidemics. Concurrently, Rosario-Rodríguez et al. (2020) documented stress related to academic workload and deficiencies in online course delivery among Puerto Rican university students. While both investigations captured dynamics characteristic of the acute phase, the present study evaluated both undergraduate students and their family members using standardized psychometric instruments in a post-emergency context.

Regarding family units, an undergraduate study conducted in Barranquilla examined familial mental health during confinement and noted that abrupt lifestyle disruptions, such as remote schooling for minors, increased caregiver burden (Barrios Cervantes et al., 2021). Peer-reviewed evidence corroborates this finding: parents constituted one of the demographic subgroups experiencing the most pronounced deterioration in overall mental health (Sun et al., 2023), and moderate family dysfunction was significantly associated with greater mental health impairment among nursing students in Colombia and Spain (Tiga-Loza et al., 2024). These precedents reinforce the empirical necessity of assessing family members alongside university students.

Limitations

This study has several limitations. The cross-sectional design and the absence of pre-pandemic baseline measurements preclude attributing observed symptom levels directly to COVID-19. The sample size was small and non-probabilistic, drawn from a single academic program, thereby limiting the generalizability of the findings. Furthermore, several contingency table cells exhibited very low frequencies, reducing statistical power. Additionally, the PSS-10 lacks standardized clinical cutoff scores (Remor, 2006), and prior SARS-CoV-2 infection history was not recorded, precluding the evaluation of symptoms consistent with post-COVID-19 condition (Soriano et al., 2022).

Collectively, recent evidence indicates that the mental health impacts of the pandemic were heterogeneous—more pronounced among women, young adults, and parents, yet more moderate than initially projected across other demographics (Sun et al., 2023; World Health Organization [WHO], 2022). In the post-pandemic landscape, the Pan American Health Organization's mandate to rebuild and enhance mental health services and systems (Pan American Health Organization [PAHO], 2023) can be operationalized within university settings through routine screening and institutional support initiatives that actively incorporate students' families.

5. CONCLUSIONS

Third-semester nursing students and their family members primarily demonstrated an absence of symptoms or mild manifestations of anxiety, depression, and perceived stress. Age, gender, socioeconomic stratum, and religious affiliation did not exhibit statistically significant associations with these outcomes, and the age-related difference observed in anxiety was not corroborated by exact testing.

Given its methodological design, this study cannot establish causal relationships nor attribute current symptom levels solely to the pandemic. Nevertheless, the identification of severe anxiety and moderately severe depression among middle-aged family members underscores the clinical importance of systematic screening and timely referral protocols. Although the concurrent educational sessions provided families with psychoeducational information on mental health and associated risk factors, intervention efficacy was not formally evaluated; future investigations should quantify educational outcomes and conduct longitudinal follow-up within this population during the post-pandemic era.

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